Life Science

Grade 6

Written by Tracy Bellaire

The experiments in this book fall under ten topics that relate to two aspects of life science: **Needs and Characteristics of Living Things; and Exploring the Senses**. In each section you will find teacher notes designed to provide you guidance with the learning intention, the success criteria, materials needed, a lesson outline, as well as provide some insight on what results to expect when the experiments are conducted. Suggestions for differentiation are also included so that all students can be successful in the learning environment.

Tracy Bellaire is an experienced teacher who continues to be involved in various levels of education in her role as Differentiated Learning Resource Teacher in an elementary school in Ontario. She enjoys creating educational materials for all types of learners, and providing tools for teachers to further develop their skill set in the classroom. She hopes that these lessons help all to discover their love of science!

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At A Glance

Learning Intentions

	Defining Living Things	Classification Systems	The Animal Kingdom	The Plant Kingdom	Moonera, Protist, & Fungi Kingdoms	Microscopic Work	Because of Diversity	Trees	Learning About Leaves	A Forest of Trees
Knowledge and Understanding Content										
Identify and describe the characteristics and basic needs of living organisms; recognizing how basic needs get met	•									
Describe the five kingdom classification model of all living things; sort and classify living things		•								
Identify the types of multicellular organisms that make up the kingdom of animals; research a species of each sub-category			•							
Identify the types of multi-cellular organisms that make up the kingdom of plants; research a plant species, determine plant category and adaptations				•						
Research and describe the characteristics, effects, and benefits of the monera, protist, and fungi kingdoms					•					
Identify the parts of a microscope and demonstrate how to use it to view and describe microscopic specimens						•				
Research examples of the interdependence of living things, determine factors that threaten continued interdependence							•			
Recognize the benefit of trees to other living things; research types of trees, their uses, and their characteristics								•		
Recognize different types of leaves and describe their characteristics; determine hidden colors in deciduous leaves									•	
Conduct a tree study to determine its characteristics and that of its leaves										•
Thinking Skills and Investigation Process										
Make predictions, formulate questions, and plan an investigation				•	•		•		•	
Gather and record observations and findings using drawings, tables, written descriptions	•	•	•	•	•	•	•	•	•	•
Recognize and apply safety procedures in the classroom	•	•	•	•	•	•	•	•	•	•
Communication										
Communicate the procedure and conclusions of investigations using demonstrations, drawings, and oral or written descriptions, with use of science and technology vocabulary	•	•	•	•	•	•	•	•	•	•
Application of Knowledge and Skills to Society and the Environment										
Discuss and evaluate the effect of human interference on the survival of living things as they strive for basic needs	•						•			•
Assess the benefits of biodiversity to all living things on the planet		•				•	•	•		•
Analyze and debate a local issue that impacts the abundance and health of biodiversity in the area							•			•

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Teacher Assessment Rubric

Student's Name: _____ Date: _____

Success Criteria	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding Content				
Demonstrate an understanding of the concepts, ideas, terminology definitions, procedures and the safe use of equipment and materials	Demonstrates limited knowledge and understanding of the content	Demonstrates some knowledge and understanding of the content	Demonstrates considerable knowledge and understanding of the content	Demonstrates thorough knowledge and understanding of the content
Thinking Skills and Investigation Process				
Develop hypothesis, formulate questions, select strategies, plan an investigation	Uses planning and critical thinking skills with limited effectiveness	Uses planning and critical thinking skills with some effectiveness	Uses planning and critical thinking skills with considerable effectiveness	Uses planning and critical thinking skills with a high degree of effectiveness
Gather and record data, and make observations, using safety equipment	Uses investigative processing skills with limited effectiveness	Uses investigative processing skills with some effectiveness	Uses investigative processing skills with considerable effectiveness	Uses investigative processing skills with a high degree of effectiveness
Communication				
Organize and communicate ideas and information in oral, visual, and/or written forms	Organizes and communicates ideas and information with limited effectiveness	Organizes and communicates ideas and information with some effectiveness	Organizes and communicates ideas and information with considerable effectiveness	Organizes and communicates ideas and information with a high degree of effectiveness
Use science and technology vocabulary in the communication of ideas and information	Uses vocabulary and terminology with limited effectiveness	Uses vocabulary and terminology with some effectiveness	Uses vocabulary and terminology with considerable effectiveness	Uses vocabulary and terminology with a high degree of effectiveness
Application of Knowledge and Skills to Society and Environment				
Apply knowledge and skills to make connections between science and technology to society and the environment	Makes connections with limited effectiveness	Makes connections with some effectiveness	Makes connections with considerable effectiveness	Makes connections with a high degree of effectiveness
Propose action plans to address problems relating to science and technology, society, and environment	Proposes action plans with limited effectiveness	Proposes action plans with some effectiveness	Proposes action plans with considerable effectiveness	Proposes action plans with a high degree of effectiveness

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Student Self Assessment Rubric

Name: _____ Date: _____

Put a check mark ✓ in the box that best describes you:

	Always	Frequently	Sometimes	Seldom
I listened to instructions.				
I was focused and stayed on task.				
I worked safely.				
My answers show thought, planning, and good effort.				
I reported the results of my experiment.				
I discussed the results of my experiment.				
I used science and technology vocabulary in my communication.				
I connected the material to my own life and the real world.				
I know what I need to improve.				

1. I liked _____

_____

2. I learned _____

_____

3. I want to learn more about _____

_____

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INTRODUCTION

The activities in this book have two intentions: to teach concepts related to life science and to provide students the opportunity to apply necessary skills needed for mastery of science and technology curriculum objectives.

Throughout the experiments, the scientific method is used. The scientific method is an investigative process which follows five steps to guide students to discover if evidence supports a hypothesis.

1. **Consider a question to investigate.**
   For each experiment, a question is provided for students to consider. For example, "Is yeast a living organism?"

2. **Predict what you think will happen.**
   A hypothesis is an educated guess about the answer to the question being investigated. For example, "I believe that yeast is a living organism because it is a cell that grows, reproduces, and responds to stimuli". A group discussion is ideal at this point.

3. **Create a plan or procedure to investigate the hypothesis.**
   The plan will include a list of materials and a list of steps to follow. It forms the "experiment".

4. **Record all the observations of the investigation.**
   Results may be recorded in written, table, or picture form.

5. **Draw a conclusion.**
   Do the results support the hypothesis? Encourage students to share their conclusions with their classmates, or in a large group discussion format.

The experiments in this book fall under ten topics that relate to two aspects of life science: **The Diversity of Living Things, and a Study of Trees and Forests.** In each section, you will find teacher notes designed to provide you guidance with the learning intention, the success criteria, materials needed, a lesson outline, as well as provide some insight on what results to expect when the experiments are conducted. Suggestions for differentiation are also included so that all students can be successful in the learning environment.

Assessment and Evaluation:

Students can complete the Student Self-Assessment Rubric in order to determine their own strengths and areas for improvement. Assessment can be determined by observation of student participation in the investigation process. The classroom teacher can refer to the Teacher Assessment Rubric and complete it for each student to determine if the success criteria outlined in the lesson plan has been achieved. Determining an overall level of success for evaluation purposes can be done by viewing each student's rubric to see what level of achievement predominantly appears throughout the rubric.

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DEFINING LIVING THINGS

Learning Intention:

Students will learn about the characteristics and basic needs of living organisms.

Success Criteria:

- classify things as living or non-living, describing the difference
- describe the characteristics of a living organism
- identify the four basic needs of a living organism and describe how these needs are met
- chose a living organism, identify its basic needs and describe how they are met
- recognize ways that humans are interfering with the natural world

Materials Needed:

- a copy of "Living vs. Non-Living" worksheet 1 for each student
- a copy of "The Defining Characteristics" worksheet 2 and 3 for each student
- a copy of "Basic Needs of Living Things" worksheet 4 for each student
- a copy of "Detailing Basic Needs" worksheet 5 for each student
- access to the internet or local library
- pencils, pencil crayons, markers, chart paper
- paint, paint brushes, plasticene, construction paper, shoe boxes, glue, scissors *(optional materials)*

Procedure:

***This lesson can be done as one long lesson, or be divided into three shorter lessons.**

1. Divide students into pairs and give each worksheet 1. They will engage in a 'Think-Pair-Share' activity to discuss the definition of a living thing, of a non-living thing, and explain the differences. Come back together as a large group to discuss and record their ideas on chart paper. (Living things show characteristics such as growth, movement, respiration, reproduction, environmental adaptation and response.)
2. Using worksheet 2 and 3, do a shared reading with the students. Along with the content, discussion of some vocabulary would be beneficial for students to understand the passage.

   Some interesting vocabulary words to focus on are:

   - organism
   - reproduce
   - respond
   - features
   - detect
   - microscopic
   - lifespan
   - characteristics
   - clones
   - stimuli
3. Engage students in a large group discussion by introducing the concept of a 'need', and how a need 'gets met'. Give examples such as:
   - You are thirsty, this is a need. How does this need get met? (you take a drink of water)
   - You are tired, this is a need. How does this need get met? (you go to sleep)
   - You are restless, this is a need. How does this need get met? (you walk/run around)

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4. Divide students into pairs and give each pair worksheet 4. They will engage in a 'Think-Pair-Share' activity to discuss the basic needs of living things, and how they meet their needs. Come back together as a large group to discuss and record their ideas on chart paper. (The basic needs of a living organism are food, water, air, and shelter.) Follow up by posing this question to students for discussion:

   'In what ways are humans possibly interfering with other living things being able to meet their needs?'

   Sample responses may be:

   - humans are polluting waters that aquatic life, live in
   - forests are being taken out for urban development, animals are losing their habitat

5. Give students worksheet 5. They will choose a living organism that they would like to learn more about. They will make a list of its basic needs and illustrate how its needs get met. They are encouraged to include captions to explain their illustrations. Students may need to access the internet or local library to obtain information.

Differentiation:

Slower learners may benefit by working in a small group with teacher direction to complete worksheet 5. One living organism could be chosen by the group, and students' responses about its basic needs and how they are met could be recorded on chart paper.

For enrichment, faster learners could design a representation of the environment that in which meets the needs of the living organism they chose on worksheet 5. This could be done by making a diorama. Dioramas could be displayed in the classroom, or somewhere in the school for others to observe. Students could also provide a written component to accompany their dioramas, which would detail the living thing and how its environment allows it to meet its basic needs.

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Worksheet 1 Name:

Living vs. Non-Living

Think Pair Share

With your partner, do some thinking and sharing of ideas about the questions below.

"What is a living thing?"

"What is a non-living thing?"

"What makes living things different from non-living things?"

Record Your Thinking!

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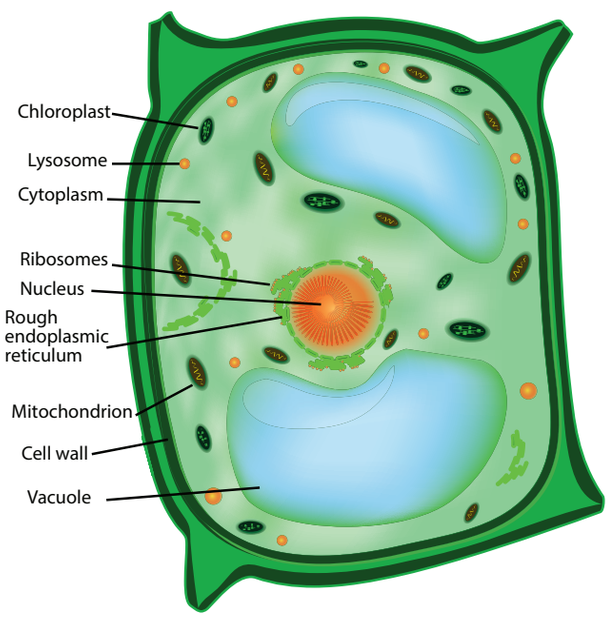
Name:

The Defining Characteristics

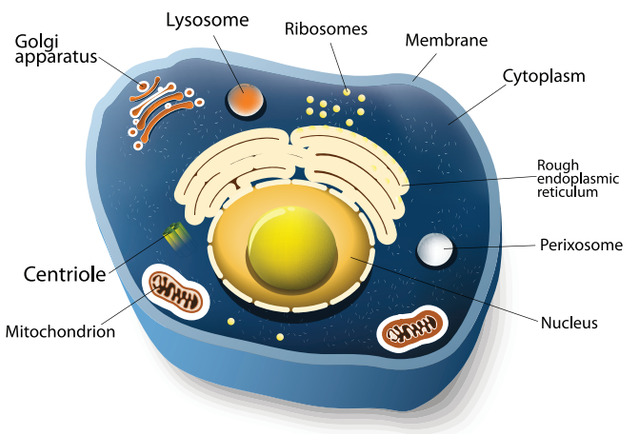
We can identify living things, or **organisms**, by considering some common characteristics.

Living things are made up of one or more cells. Cells are tiny microscopic units that keep an organism alive. In larger organisms, such as a human being, cells connect together to form larger structures. They form into tissue and even into whole systems in the human body, such as the digestive system. The cells in an organism have different purposes that work to keep the living organism functioning.

PLANT CELL



ANIMAL CELL



A cell of a plant and a cell of an animal have some similar features. For example, they both have a nucleus at their centres. They also have some distinct differences. Plants cells are rectangular in shape, while animal cells are more round and irregular.

Living things grow and develop. Living things, such as a human being, grow over time. Using the human being as an example, we know that its' features change from a small size to a large size as it ages. Development is change that a living thing experiences. For example, a human being starts as a single cell in the womb of its mother, and develops into a baby over time.

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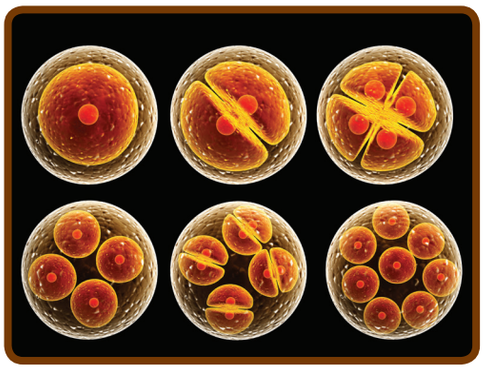
Name:



Living things reproduce. Most mature living things have the capability to create more life forms of their species. Some living things mate to reproduce. These new life forms are referred to as offspring. These offspring will generally have some characteristics of both parents.

Other living things reproduce by simply dividing into two or more parts, such as in the case of cells. Molds, bacteria, and some plants reproduce this way too. Organisms produced in this way have no genetic difference from the parent organism. They are called clones.

All living things will eventually die. The time that they spend alive is called a lifespan. Some organisms have a long life span, while the life span of others may be only a few days or even hours.

Did you know that the lifespan of a house fly is only about four weeks?

The giant tortoises in the Galapagos Islands are the longest-lived of all vertebrates. Their average lifespan is 100 years. The oldest tortoise on record lived to be 152.

Living things respond to stimuli. Living things respond to changes in their environments, such as heat and light. Living things make use of senses to detect these changes, and then they can respond. For example, a lizard will sense the heat of the sun, and come out and move about. Tulips are an example of a living thing that responds to differences in light and dark. Did you know that at night it closes up its petals, as if to go to sleep for the night? When a living organism responds to stimuli, there is usually movement or change of behavior. The speed of response will vary between organisms.

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Name:

Basic Needs of Living Things

Think Pair Share

With a partner, do some thinking and sharing of ideas about the questions below.

"What are the four basic needs of a living thing?"

"How does a living thing meet these needs?"

Record Your Thinking!

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Name:

Detailing Basic Needs

Choose a living thing that you would like to know more about. What are its basic needs? Do some research to discover, how this living organism meets its basic needs.

Living Organism: _____

Basic Needs:

_____ _____

_____ _____

Illustrations of the living organism meeting its basic needs:

Caption:	**Caption:**
Caption:	**Caption:**

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CLASSIFICATION SYSTEMS

Learning Intention:

Students will learn about the five kingdom classification model of all living things.

Success Criteria:

- discuss and evaluate the benefits and disadvantages of biodiversity on planet Earth
- define classification and detail its importance to science
- sort objects according to differences and likenesses, explaining the classification rule
- recognize living things in a local area, then sort them according to a classification system
- describe the five kingdom classification model, sort living things using this model

Materials Needed:

- a copy of "Discussing Biodiversity" worksheet 1 for each student
- a copy of "Classification" worksheet 2 and 3 for each student
- a copy of "Sorting in the Schoolyard" worksheet 4 and 5 for each student
- a copy of "Classification in the Natural World" worksheet 6 and 7 for each student
- pencils, pencil crayons, markers, chart paper
- magnifying glasses, clipboards, iPads or iPods

Procedure:

***This lesson can be done as one long lesson, or be divided into four shorter lessons.**

1. Divide students into pairs and give each worksheet 1. They will engage in a 'Think-Pair-Share' activity to discuss the meaning of diversity of living things, the benefits of it, and the disadvantages of it. Come back together as a large group to discuss ideas.
2. Discuss with students the meaning of classification. Give examples of how to sort and classify by using some common objects around the classroom. Ask students to sort the objects and explain their reasoning for their groupings. Give students worksheets 2 and 3 to complete.
3. Give students worksheet 4, a clipboard and pencil. Take them outside to the school yard or local area to look for living things. Students can record what they see by drawing pictures or making written lists. An alternate or additional option is to take along iPods or iPads to take pictures of the living things that they see.
4. Upon returning to the classroom, give students worksheet 5. They will sort the living things that they recorded, detailing their classification system. A follow up option is to have students share their finished work with a classmate in order to promote discussion.
5. Using worksheet 6, do a shared reading with the students. Along with the content, discussion of some vocabulary would be beneficial for students to understand the passage.

   Some interesting vocabulary words to focus on are:

   - organisms
   - invertebrates
   - unicellular
   - vertebrates
   - nucleus
   - multicellular
   - photosynthesis
   - kingdom
   - algae
   - complex

6. Give students worksheet 7 to complete.

Differentiation:

Slower learners may benefit by working in a small group with teacher direction to complete worksheets 2 and 3. Worksheet 3 could be discussed and completed together on chart paper.

For enrichment, faster learners could graph the data that they collected and classified on worksheet 7.

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Worksheet 1 Name:

Discussing Biodiversity

Think Pair Share

With a partner, do some thinking and sharing of ideas about the questions below. Record your ideas in the chart.

"What is biodiversity?"

My Thinking	My Partner's Thinking

"What are the benefits of having diversity of living things?"

My Thinking	My Partner's Thinking

"What could be the disadvantages of having diversity of living things?"

My Thinking	My Partner's Thinking

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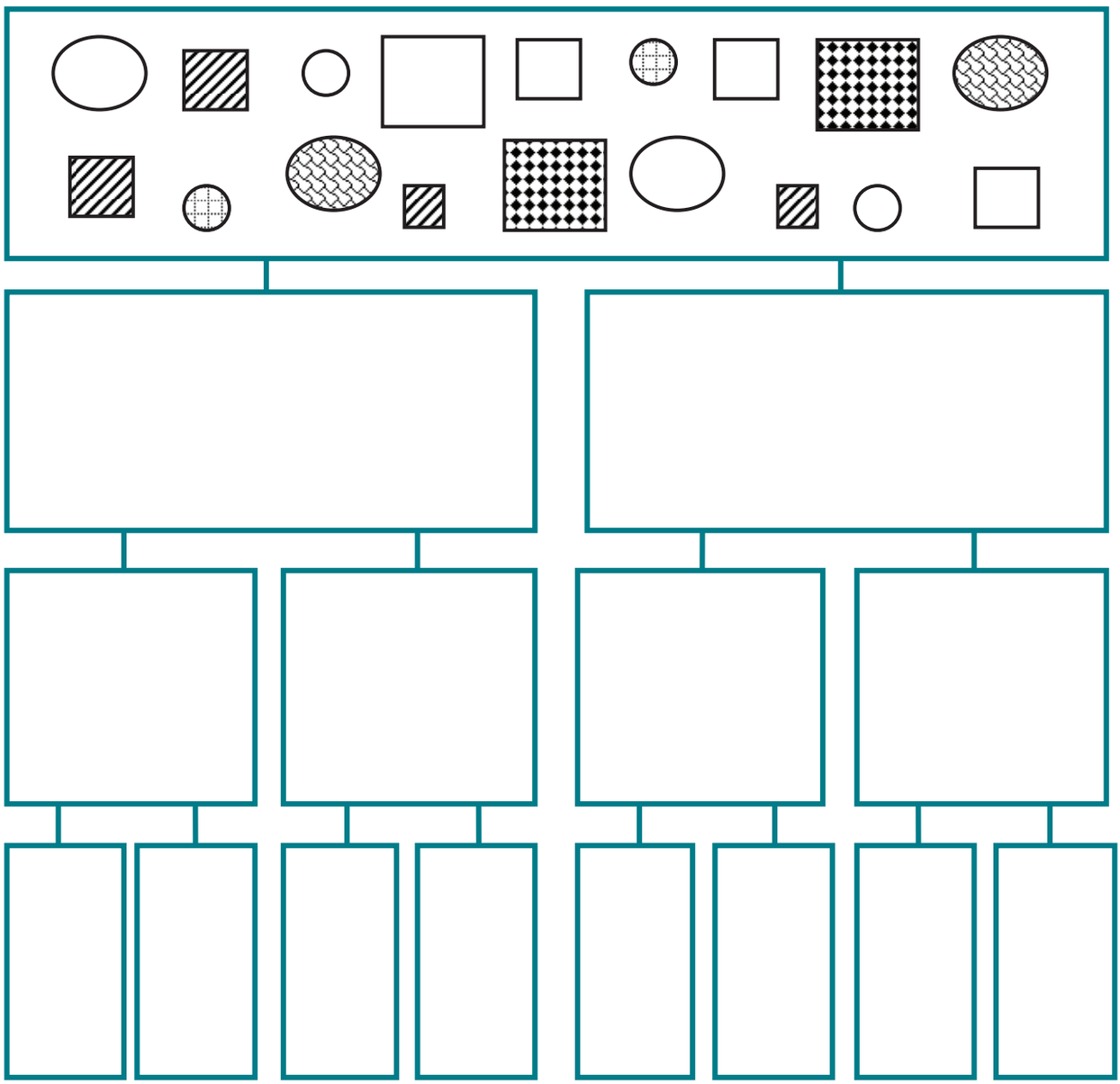
Worksheet 2 Name:

Classification

There is such diversity of living things on our Earth. Scientists keep track of the different types of living species by using a classification system. A classification system uses a set of criteria to sort things into groups, considering differences as well as similar characteristics. Let's try it!

Tree diagrams are often used to sort and classify items. Sort the shapes below by drawing them in the tree diagram. Be ready to explain your reasoning.



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Worksheet 3 Name:

We use classification systems in our everyday lives all the time. Classification helps us with organization. Location of items can be found more easily and quicker when they are classified into categories.

Complete the chart below to explain the classification systems used in these everyday life situations. Add an idea of your own in the last row.

Everyday Item/ Situation	How is classification used?
Books in a library	
Groceries in a supermarket	
Sporting goods in a sporting goods store	
Recipes in a cook book	
Menu items in a restaurant	

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